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THE ORGANIZATION OF THOUGHT

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An idea tower like Mohammedan theology, Roman law, or the *Nibelungen Lied* is no less a team product than Solomon's Temple or the Panama Canal. No pyramid or cathedral embodies the labors of so many generations of artificers as the science, let us say, of astronomy. The Common Law, the Yogi philosophy of India, or a matured branch like physics constitutes a well-knit system, and yet no one head, or even score of heads, can claim the credit of so much logic. Somehow the thinking of many men has resulted in a whole composed of congruous elements fitted together as steel beams are fitted together into a bridge span. The process of thus articulating ideas may be termed "the organization of thought."

Nor does system-building exhaust the co-operation of minds. Common opinion—class, group, or public opinion—is usually the resultant of many individual contributions, the residue left after the offerings of each have been winnowed in the minds of the rest. Behind the eighteenth-century liberal movement, the romantic movement, the Oxford movement, behind impressionism, realism, symbolism, or anarchism, lies a complex of ideas which no one man propounded. A "school" of thought, of literature, or of art starts not always with master and disciples, founder and followers; often it begins with a band of like-minded rebels against the conventional, who stimulate and influence one another until they work out a creed, a style, or a manner which can make its way. The child in us demands a hero for every great achievement; and so the public clamors to be shown the "father" of the labor movement, of industrial unionism, of scientific charity, of the new penology, or of the public-recreation movement. As likely as not, the "parent" turns out to be a group of seminal minds coming gradually into touch and finding their way to a common doctrine or program.

There is intellectual team work, too, on much smaller problems than those of society-at-large. In each subgroup—church, college, trade union, or co-operative society—there goes on a joint working out of opinion as to the special problems and policies of that group; and while opinion may reflect the counsel of some sage member, it is usually the outcome of discussion and consensus, i.e., of co-operative thinking.

Absorbing the product of others is not the same as producing. As society develops, the proportion of us who bear a hand in organizing thought becomes less. More and more our headaches come from the effort to appropriate the fruits of other men's thinking. The primitive tribesman had more influence on current ideas of right and wrong than has the common man after theologian and philosopher take part in fixing moral distinctions. Early law springs from the customs of the folk, but the time comes when judges, jurisconsults, and lawgivers have most to do with its fashioning. Poetry improvised, sung and danced to, stanza by stanza, in the primitive festal crowd, ends as the handiwork of a few gifted word-smiths. About the time of Socrates we see fruitful philosophic thinking quit street corner and market-place to hide with a circle of choice spirits in some secluded garden. In Athens, says Zimmern, "the first people to make a regular use of private gardens and to look upon them as indispensable were the philosophers."¹

The reason for this concentration is near at hand. Team-thinking goes on only among persons well matched in equipment. Hence, as soon as there appear in any field men of special knowledge or training, with exceptional facilities in the way of collections, laboratories, travel, mutual access, and stimulating association, the rest of us fall silent and content ourselves with walking henceforth in trails other men have blazed. The rise of scientific medicine makes it impossible for "wise" women with their herb gardens to contribute to the art of healing. With the spread of agricultural experiment stations, the intelligent farmer with only his own experience to go on makes no further contribution to agriculture. As the tasks of government become more technical—e.g., sanitation, conservation, and regulation—the political

¹ *The Greek Commonwealth*, p. 56.

talk of pothouse and corner grocery is paralyzed with a sense of futility.

In a word, just as we become parasites on the experts who wire our houses and test our food, so our minds become parasites on the specialized minds engaged in rearing law, morality, literature, and science. The organizing of thought in respect to fundamentals is left to a rather small number of men. More and more we retire to the side lines and watch the star players advance the ball. The bulk of us are consumers of the mental products of the masters, mere passengers who do nothing to get the ship forward, but (sometimes!) pay the wages of those who work her.

Our growing passiveness in respect to constructive thought does not cause us to become equally passive as regards decision. Jealously we cling to our place in *will-organization* even if we drop out of *thought-organization*. The specialist shall not steal away the layman's freedom. Although most of us no longer discuss the foundations of right and wrong for fear of getting beyond our depth, we choose freely between the traditional ethics and the new moralities. For all that the framing of religion now goes on far above his head, the ordinary man is not mentally enslaved so long as he may please himself as to the type of religion he adopts. The committing of the technical tasks of government to trained men does not, as some allege, substitute "government by experts" for "the people's government." The determining of functions and policies still rests with the citizens or their representatives. State highway engineer, food chemist, forester, or pathologist is there only as a servant to carry out effectively their purpose.

UNCONSCIOUS ORGANIZATION OF THOUGHT

Worn path and made road are collective products, but the makers of the former knew not what they did. Until writing or printing made it possible to fix and identify the product of the individual artist or thinker, the organizing of thought into stable forms must have gone on mainly in an unconscious way. That greatest storehouse of thought, *language*, came into being by a process which scholars describe as *growth*, rather than *production*.

Tarde gives all the credit of language to word inventors, forgetting that every word or phrase they coined had to run the gauntlet of the tribe. Only those which struck one's fellows as pat or fit survived, and they were trimmed or twisted to suit better the tongues or minds of the users.

So was it with the making of popular proverbs, saws, and riddles. Some, no doubt, were struck off perfect in an inspired moment; but others reached their terse and telling form only after many wits had helped to file and point and barb them. No end of sayings failed to "make a hit" and were forgotten; so that the ones treasured and handed down were just those which "rang a bell" in the average mind.

Nor are early myth, fairy tale, legend, folk-song, or ballad to be looked upon as the handiwork of the individual artist, like the modern poem or drama. Scholars now assure us that they were "communal" in origin, meaning, not that the "people" was their author, but that so many had a hand in fashioning them and that, being transmitted only by oral tradition, they were so easily molded to the general taste, that each embodies and expresses, not an individual mind, but the soul of the tribe or the folk. The author of the ballad, insists Professor Gummere, is "the singing, dancing, improvising crowd." Among primitives, as among old-style European peasants, nearly everyone can improvise. Says Grosse, "Every native in Australia himself provides the songs of his house." Among the Eskimos "nearly everybody has his own songs." In the festal dance songs are built up bit by bit, one after another contributing a short improvisation in the intervals of a chorus. Winnowed, handed down in tradition, and gradually perfected, these become ballad and folk-song.

Thanks to literary research, we no longer look upon the folk-epic as the creation of a single genius, but as a unified collection of song-stuffs which have long been accumulating. The epic poet is the heir to great treasures. For arranging and harmonizing the traditional materials, filling the gaps, rounding it all into an artistic whole, and writing it down, he gets the glory of the epic; but we now recognize him as, in truth, the artistic organizer of the lays of many forgotten singers.

When a folk takes to reading, it loses the knack and the courage for improvising; the communal poesy dies out, and the individual artist holds the center of the stage. Thus arises a kind of parasitism, the people at large becoming passive consumers of literature, while production shrinks to the one in ten thousand—the creative man of letters.

Early morals and custom were a snug fit because the outcome of an unconscious process. Rules arose, not from reflection upon the requisites of social order, but from the clash of egoisms. The conflicting desires of interfering individuals ground against one another until, in conceding that one must not “remove the landmark” nor “make the ephah small” nor “withhold the pledge” after the debtor had repaid the loan, they ceased to chafe. Thus folk molded law as hand molds glove. Then came the individual thinker—prophet, lawgiver, religious teacher, schoolman, canonist, moral philosopher—correcting or completing folk custom and law. Finally, in working out national codes and framing great pieces of constructive legislation, our own time has discovered how to procure the collaboration of many picked minds.

Once written down or printed, a man's work is tagged and stays as he left it. As such accumulate, the communal fount dries up. Specialists and schools arise, so that the people at large have no part in advancing thought or art. The folk being out of it, why does not the individual take the bit in his teeth and bolt? Surely there will be confusion, a riot of temperament and caprice! No, the thought of an age shows much consistency and dovetails fairly well into the past. If agreement is wanting in its metaphysics or ethics or philosophy, it is because rival systems divide the field, each of them, however, a logical structure. Most of the literary masterpieces of a period show certain common characteristics, as if the writers had been taking account of one another.

One reason is the dependence of the creative genius on other geniuses, living or dead. Few minds become pregnant with literature until they have been fructified by close acquaintance with the best that has been said or sung. Herder has this in mind when he speaks of *die Kette der Bildung*. Taine exhorts the striving artist: “Fill your spirit and your heart, however great they may be, with

the ideas and feelings of your century and the work of art will come." In explaining a writer he attaches great importance to the *moment*, i.e., the direction that art happened to be taking at the time.

Another organizing influence is the *public*, which acts as a sieve, letting some products of genius pass while others drop to the scrap heap. Since thinkers cannot give ethics or law a slant that shall bring it into constant clash with the popular sense of right, since poets and artists cannot long run counter to the popular taste, the barren public is after all a sleeping partner in the culture of the time. To the fertile spirits it might well utter the warning: "They reckon ill who leave me out." The public, however, has little to do with the rising structure of science. Unlike jurisprudence or literature, which have to suit themselves to the people, science has to conform to reality. Its line of advance is determined by its own canons of truth, not by popular favor. A music the people will not listen to, a literature they will not read, a morality they will not approve, can hardly be said to exist for them; but a science they do not comprehend may be serving them in countless ways.

CONSCIOUS ORGANIZATION OF THOUGHT

Of the older forms of organization, Mr. Wallas, who has shed more light than anyone else on the organizing of thought, says:

The simplest and oldest is that which is constituted by a small number of persons—from two to perhaps seven or eight—who meet together for the purpose of sustained oral discussion. This form may be studied at its finest point of development in the dialogues of Plato. It is, as the Greeks knew, extraordinarily difficult. At first sight it might appear that the main condition of its success is that it should be as little "organized" as possible, that the group should meet by accident, and that each member of the group should freely obey his casual impulses both in speaking and in remaining silent. But a closer examination shows that the full efficiency of argument, carried on even by the most informal body of friends, requires, not only that each should be master of the most delicate shades of the same language, and that each should be accustomed to make use of similar rules of Thought, but that they should have a large body of knowledge in common, that each should be familiar with the peculiar strength and weakness of each of the others, and, above all, that each should be influenced by the same desire to follow truth "whithersoever the argument may lead." All this requires that the group should consist, not

of men of average powers who have come accidentally together, but of men selected (as Socrates, for instance, selected his disciples) in some way which should secure that the worst of them should possess a rather unusual share of natural ability, acquired training, and interest in ideas. And normally, the necessary discipline and concentration cannot be secured unless some one of the party is accepted by the others as a leader, and does not abuse his position.¹

The neglect of dialectic in our own time he attributes to the difficulty of modern philosophers coming together frequently, to their need of economizing time, to the rôle of the printing-press in circulating ideas, and to the fact that the modern scientist does much of his thinking while he is closely observing the concrete in the laboratory or the field. He insists, however, that we now rely too much on reading and solitary thinking, and that, in branches whose subject-matter is human action and feeling, oral dialectic "has magnificent possibilities of fertility." One advantage is "a great extension of the range of immediate mental association." The solitary thinker, having tackled a problem, "waits till some promising idea comes into his mind and then dwells on it till further ideas spring from it." But if a group is engaged upon the problem, the waits are shorter, and each gets the benefit of such happy thoughts as occur to the others.

Apart from this, many minds are keyed to their best only when exchanging ideas with other congenial minds. The conditions that rouse the subconscious self to productivity vary greatly for different people. In olden time intellectuals sought the monastic cell; today they shut out distraction by means of a soundproof sky-lit studio at the top of the house. Some are most visited by ideas in darkness, or by artificial light. The born orator, on the other hand, is never so inspired as before "a sea of faces." Some get their best thoughts on an express train, while I know of an eminent mathematician who took his hardest problems to the opera, where the lights and the stir gave his intellect a rare edge. I myself have never had such free and onward thinking as in the thronged noisy streets of far, strange cities, where I knew not a word nor a soul.

Solitude is needed, to be sure, for working out and harmonizing ideas, but usually one's mind leaps and mounts best in discussion

¹ *The Great Society*, pp. 242-43.

with a few kindred spirits who have like intellectual background and interest, attach the same meanings to words, and recognize the same rules of thought. The visible effort of each suggests a like effort to the rest. Challenge rouses the emulative spirit, and there is incitement in the evident zest of one's fellows in the chase of ideas.

Such dialectic is, however, rare, for it presupposes a technique which few know, or, knowing, will observe. Apart from such obvious pitfalls as lack of real mental sympathy among the participants, use of terms in different senses, neglect to define the issue, straying from lack of leadership, we see countless discussions end in nothing because there has been, in fact, no co-operation. One welcomes the chance to air his prejudices. Another loves to hear himself talk. This disputant thinks he is in a tourney, while that one knows nothing of the subject, but will display his versatility. If any one participant lacks respect for others, good manners, or a love of truth greater than love of self, the discussion turns into fireworks, a sparring match, or a monologue.

Discussion conducted through writing or print eliminates personal factors—appearance, voice, manners, etc.—which in oral discussion often prove a stumbling-block to concerted thinking. On the other hand, it is less stimulating to the minds engaged, and the participants may miss a close grapple. Sophistry, insincerity, and pose are not so promptly unmasked as in oral intercourse. Contrasting the mode of organizing thought in government departments with the oral methods of Parliament, Mr. Wallas observes:

The total effect, therefore, of a modern official organization based solely on writing is the combination of great efficiency in the handling of detail on established lines, with the existence of an "official atmosphere" which may be incompatible with some of the finer intellectual requirements of government, and has, in fact, often produced a general dislike of official methods among the outside public.¹

How formal discussion has fallen into discredit as an instrument for ascertaining truth! Recall the breathless interest in theological and metaphysical disputes in Christian Alexandria, Antioch, and Byzantium. In the Middle Ages it stood in high favor, and it was

¹ *Ibid.*, p. 270.

not until well into the modern era that Sir Henry Wotton expressed his belief that "the itch of disputing makes the scab of the churches." Once scholars could think of no better feat for the budding Doctor of Philosophy than to take a position and hold it against all comers. Years ago in the University of Berlin I saw a youth qualify for his doctorate by defending his "thesis" against three friends, each attacking it in a speech prepared in advance by the candidate himself and gracefully surrendering after his objections had been neatly bowled over!

That we now see disputation as *conflict* rather than *co-operation*, with the waste that antagonistic effort always entails, is owing, no doubt, to the triumphs of science. The students of nature have got on so wonderfully, not by wielding sharper wits than the schoolmen had, but by resorting to observation, experiment, measurement, and record. Their technique for interrogating the concrete succeeds even in the attack upon the problems of mind, government, and society, so that every year sees it carried into new fields of inquiry. Research leaves, to be sure, a place for the arena, but we realize now that full knowledge of the relevant facts is a prerequisite for profitable discussion. It is just because they were unprovided with the results of impartial, well-directed investigation that the intellectual athletes of the Middle Ages did not get far with all their debates and polemics.

When men of science meet, how much time is given to presenting the results of investigation, how little to discussion! Such difference of opinion as may develop touching the correct interpretation of these results is presently traced to some flaw or ambiguity in the data, which can be removed by ascertaining certain facts not yet brought to light. Instead of running on without getting anywhere, discussion but points the way for a fresh sally into the concrete. If genealogies and herd books leave students of heredity still in doubt, they devise crucial breeding experiments which will settle the question one way or another. If geologists differ as to the number of glacial periods the deposits indicate, instead of wrangling they scatter to renewed study of moraine and drift. Let sociologists disagree as to whether fewer births mean declining fertility or limitation of the family, and someone soon

settles the matter by a questionnaire drawing out confidential information from some hundreds of married couples. The continual expansion of government statistical inquiries testifies to the demand for adequate data as a basis for the profitable discussion of proposed laws and policies.

What of forensic disputation as a means of organizing the thought of judicial bodies about a lawsuit?

Despite the glowing testimonials lawyers give it, doubt is spreading as to the value of the time-honored contentious procedure of the courtroom. The best-qualified man there, the judge, it reduces to a mere umpire. Hence a rising demand that his rôle be magnified, if not to that of a Continental judge, then at least to that of an English judge. More and more, chemists, physicians, and alienists testify *for the court*, not for one side, and some of our courts retain such experts on their staff. In the juvenile court the methods of drawing out the truth and reaching a judgment resemble those of a clinic. Before the great administrative boards that have been set up lately in some states—public utilities commissions, industrial commissions, etc.—a direct, matter-of-fact procedure borrowed from science leaves small scope for the battle between opposing lawyers. On a question of grade crossing or factory ventilation, instead of hearing advocates, the commissions have their trusty agents get the lie of the land or analyze the factory air. It seems probable, then, that in adjudication the methods of the laboratory will gain upon the methods of the forum.

There is good reason why popularly-elected representative assemblies the world over have lost prestige, so that people are coming to hearken more to intellectuals outside of public life—university presidents, inventors, scholars, philanthropists, and captains of industry—and less to parliamentary orators. Owing to the clamor of each locality to have its own man in the legislature, the lawmaking body is so large that only by courtesy can it be called “deliberative.” It is there *to register will*, and this function keeps it bigger than any thinking group should be. It includes too many who are inert, or who clog the swollen current of discussion with “buncombe,” for the “folks back home.” The thinking members themselves are vitiated. Before an assembly so large they fire

off speeches of the lamp, which so poorly focus upon the issues developed in discussion that opponents glide past each other like locomotives on parallel tracks. They are tempted to oratory, the foe of logic, and to partisan debate, the foe of reasonableness. Candor well-nigh perishes, for it is harder to recede or accept correction before hundreds than before tens. Hence the "House" limits itself to ultimate decision, while the hammering of laws into shape goes on only in committees of a dozen men or less.

The democratic-looking proposal to make all committee sessions public is a proposal to hunt frank and fruitful discussion from its last refuge in capitols. The barrenness of the average full-dress legislative debate is due to pose, the participants addressing, not their fellow-members, but a less-enlightened outside public. Instead of candid man-to-man talk, we get claptrap and sparring for party advantage. Publicity would introduce a like insincerity into committee discussions and oblige the majority representatives to talk matters over informally in advance in order to clarify their minds before the curtain went up.

The bodies charged with thinking upon the policies of business corporations, colleges, charities, associations, and clubs are small, rarely including more than a score of members. Such a group is not unwieldy, but still it is a problem how to get all the members to keep their minds taut. Thus Mr. Wallas testifies:

I have myself, during the last twenty-five years, sat through perhaps three thousand meetings of municipal committees of different sizes and for different purposes, and I am sure that at least half the men and women with whom I have sat were entirely unaware that any conscious mental effort on their part was called for. They attended in almost exactly the same mental attitude in which some of them went to church—with a vague sense, that is to say, that they were doing their duty and that good must come of it. If they became interested in the business it was an accident. Of the remaining half, perhaps two-thirds had come with one or two points which they wanted to "get through," and meanwhile let the rest of the business drift past them, unless some phrase in the discussion roused them to a more or less irrelevant interruption.¹

Such persons are prone to follow the lead of dominating individuals who will spare them brain wear and tear. Not long ago

¹ *The Great Society*, p. 276.

the governing boards of some great American corporations had so abdicated their thinking function that directors intrusted with the interests of thousands of stockholders would in ten minutes dispose of motions involving tens of millions of dollars. The arrogant order, "Vote first and debate afterward," shows how the magnate had come to look upon the board as his private rubber stamp. Says the Interstate Commerce Commission of the New York, New Haven & Hartford Railroad Company: "A number of directors appear in many instances to have voted without knowledge and to have approved the expenditure of many millions without information. . . . They merely approved what had been done by some committee or some officers of the Company. The directors' minutes reveal that it was largely a body of ratification."

The evil and ruin that followed in the wake of such financial dictatorships show how barbarous it is in vast and complicated affairs to rely on individual judgment rather than on concerted thought.

A skilful chairman may do much to lift the intellectual torpor of which Mr. Wallas complains. By a stroke here and there a man gifted with imagination may so link the business in hand with vital persons and issues as to whet interest. By feigned skepticism or carping criticism of the good ideas put forth he may irritate the more inert members to the point of attention. Or he may dart a timely glance, a query, or a personal allusion that will rouse the flagging mind to effortful thought. The fact is that the psychology of small deliberating groups has never been properly brought to book.

Thanks to our growing dependence on the vast impersonal organization that goes on far above our heads, reading is taking the place of oral intercourse as a source of ideas. Machinery and shop supervision are squeezing spoken discussion out of the working hours of wage-earners, while the reading habit restricts it in their leisure. Most urban minds feed on newspapers as silkworms feed on mulberry leaves. Upon the consciousness of multitudes the daily sheet stamps impressions, ideas, and beliefs, just as the Hoe press prints endlessly the same thing upon miles of white paper.

Even if the wider reading of magazines and books should check the manufacture of public opinion in this wholesale way by irresponsible newspaper owners, it would still be bad for the bulk of people never to get beyond so unstimulating a way of gaining ideas. Welcome, therefore, be the newer pedagogy which encourages the pupil to self-activity and trains him to debate and the oral interchange of ideas! Even more promising is the spread of "social centers," where neighbors in their common hall consider community problems of which they have first-hand knowledge. While some public matters are passing out of the range of profitable popular discussion into the hands of specialists, many personal and family problems are coming to be in a way community problems needing to be threshed out in neighborhood gatherings.

THE PLANNED ORGANIZATION OF THOUGHT

In various spheres intellectual co-operation on a large scale has been worked out. Take, for example, the political party. Where, as in South America today, no machinery exists for eliciting judgment on public questions from numerous scattered persons, the formulas of a party emanate from a few leaders, who put forth the best compromise they can make between what they think and what they imagine will appeal to the voters. In our early history a political program would be worked out by the members of Congress belonging to the same party. In a later stage local party supporters choose delegates to a convention which considers the declaration of principles laid before it by a large and representative "committee on the platform." Still later an intermediate body, such as the "state convention" may not only declare itself on state questions, but may formulate its judgment as to national issues in advance of the action of the national convention of its party.

Although the delegate convention exists primarily to arrive at common *purposes* rather than at common *judgments*, i.e., to find out what the members *want*, rather than what they *think*, there is a plain tendency for the deliberating element of a party to become larger. The political "manifesto" put forth by a small influential group has had its day. Experience shows that, when the proper machinery is provided, a considerable number of persons can be

included in the party brain. That the ultimate sources of their opinions may be half a score of statesmen, editors, or philosophic writers does not qualify the statement that the political party is moving toward a more comprehensive organization of thought.

The same tendency is to be seen in government. Now that government every year touches the lives of its citizens at more points, there is need of a wider organization of thought respecting particular projects of law. Since nowadays the legislative committee is the incubator of laws, one means of getting more thought behind a law is the public committee hearing. To be sure, most of those who appear represent *desire* rather than *thought*; and the law smiths profit little from learning that exporters or coal operators or trainmen are *for* or *against* something. Nevertheless, the spokesmen for scientific and professional bodies and for public welfare organizations frequently contribute judgments which a great many first-class minds have helped to form.

One foresees not only that committees will more often sit between legislative sessions and hold hearings in different places, so as to sample thoroughly the mind of the country, but that they will more frequently resort to the principal thought foci in society. Groups of disinterested experts such as are found in the Efficiency Society, the Genetic Association, the Life Extension Institute, the Institute of Criminal Law and Criminology, and many like bodies, will be invited to give an opinion as to legislative proposals within their field, or even to formulate the essentials of a sound public policy.

Nor should it be forgotten that administration presents certain intellectual apexes. In the older theory of self-government the civil servant was an inert tool, from whom the representatives of the government could learn nothing. We now see that the trained permanent official is quite as able a man as the legislator and possesses, moreover, a fund of valuable technical knowledge and experience which the legislator lacks. No doubt the official is prone to press for more money and authority than he ought to have. Nevertheless, in the interest of rational law-making, there should be nothing to hinder the head of an inspection service, the chief forester, the superintendent of insurance, or the chairman of the

farm-loan board from appearing before a legislative committee on a matter within his ken and shedding on it such light as he may have.

Unless there is this intellectual commerce between the two branches of government, the legislature must more and more confine itself to determining general policies, leaving to the administrative department a wide field of discretion. Instead of fixing the fishing season for each of several lakes, prescribing in detail the compensation for the various kinds of injury arising from industrial accidents, or specifying which railroads shall carry passengers for two cents a mile and which may charge two and one-half cents, such matters will be confided to well-paid experts gradually developing their policies out of their experience in working with the concrete.

In scientific inquiry intellectual co-operation is very old and highly developed. The Academy of Plato, who bequeathed to his followers his walled garden and appointments in the place in Athens named after the hero Hekademus, became the model for all scientific bodies and universities, just as the famous Museum of Alexandria gave its name to all our collections of scientific materials. In the words of Cicero, "It is from this Academy, as from a regular magazine of all the arts, that mathematicians, poets, musicians, aye, and physicians too, have proceeded!"

In the great research institution maintained in Alexandria by the Ptolemies, the state makes its first appearance as promoter of the arts and sciences. The brilliant contributions of the Alexandrian school were due not wholly to the observatory, library, dissecting house, laboratories, and collections provided, nor even to the endowment of productive scholars. In the Museum, as in a modern university, were gathered astronomers, geographers, mathematicians, physicists, naturalists, and historians, who not only studied and meditated, but, through converse and debate, kindled one another to a brighter incandescence, like embers laid together.

The sixteenth and seventeenth centuries witnessed the founding of several academies of inquirers, who examined and discussed one another's contributions to knowledge and decided which deserved to be published. Italy led the way in forming such groups, the most famous of which is the *Accademia dei Lincei* ("of the lynx-

eyed”), which had as one of its earliest English members the great champion of the inductive method, Lord Bacon. The Paris Academy of Sciences, instituted in 1666, has the most brilliant record of all for the sending out of scientific expeditions, the support of fruitful research undertakings and the co-ordination of inquiries. The French Institute, incorporated shortly after the Revolution, has undoubtedly done more than any other single agency to focus choice minds upon the problems of pure knowledge.

Three centuries ago, Lord Bacon in his *New Atlantis* imagined a great research institution which he called “Solomon’s House,” for which he outlined a very elaborate division of intellectual labor. Besides various groups of experimenters, he provided for three, poetically called “Lamps,” who after considering the work of the experimenters “should take care out of them to Direct New Experiments of a Higher Light, more Penetrating into Nature than the Former.” Then, besides such as “do Execute the Experiments so directed, and Report upon them,” there should be yet another three, known as “Interpreters of Nature,” who should “raise the former Discoveries by Experiments, into Greater Observations, Axiomes, and Aphorisms.” This prophecy was in a way realized in the founding in 1662 of the Royal Society of Great Britain and influenced the vast collaboration of scientific men in the French *Encyclopédie* of the eighteenth century.

In modern science, the tendency to vaster and more sustained co-operation is pronounced. Some learned societies have embarked on undertakings which have required well-nigh a century to complete. The investigation of natural events which recur infrequently, like earthquakes and sun-spot periods, or of very slow processes like star movements, climatic alterations, land elevations or subsidences, and the evolutionary changes in organisms, call for a volume and continuity of effort far surpassing the scope and span of life of any individual inquirer. There is even an international association of academies which has helped bring about world-wide co-operation in solar research and in the anatomy of the human brain.

No doubt such teamwork is more successful in providing data than in discovering new truths. The history of science shows that

the guiding and fruitful ideas which contain the seeds of later developments spring up in the mind of the solitary investigator or thinker. Remember Wordsworth's lines on Isaac Newton's statue at Cambridge:

The marble index of a mind forever
Wandering through strange fields of thought alone.

It is certain, however, that he who wrests new secrets from the Sphinx must watch the product of his co-workers everywhere and keep in constant and vital touch with everything that every creative mind the world over is doing in his field. Bound closely together by their special societies and journals, the attackers of the same problem in many lands form, as it were, a single band of treasure-seekers digging in neighboring spots for buried gold.

While many may join forces in working out a group of alkaloids, investigating radioactivity, or carrying out a vast experiment in heredity, it is not so in the sphere of art. Never does the work of art bear the name of a group. Normally, the book, the poem, the play, the picture, the bust, the song, is the product of an individual. Nevertheless, in art one notices a certain development of organization which is unknown in science, viz., *the profession of critic*.

Since the best critics of the product of scientific thought are other scientific workers, there is no tendency in science for production and appraisal to be segregated with different groups. In art and literature, on the other hand, there is a distinct function, that of *criticism*, discharged by men who are not necessarily poets, playwrights, composers, painters, or sculptors. Indeed, critics are rarely creative; so that the creative spirits, resenting the critic coming between them and the public, fling the sneer: "Those who can, do; those who can't, criticize." However, in view of the output clamoring for attention, the public is obliged to choose what it shall read, or listen, to or look at, and without the critic it would be at the mercy of the megaphone and the "ad" man. Those who "know what they like" naturally have less influence on the choices of the public than those who know *why* they like or dislike and can state their reasons convincingly.

The product of the investigator runs no gauntlet of professional critics because, in order to fulfil its mission, it is not obliged to attract

the attention of the public. A discovery about bacteria or enzymes may serve mankind just as well if it reaches only the physicians and sanitarians. Truth may minister to us at any number of removes and needs not, therefore, be apprehended by him whom it is to serve. A work of art, on the other hand, is intended to act upon us directly. The poem or picture is not a means to something beyond, but makes an immediate appeal to the human spirit. It is the inevitable rivalry of artists to attract the notice of the busy preoccupied public that calls into being the professional critics of literature, music, art, and drama.